A systematic revision of species of the catfish genus *Amphilius* (Siluroidei, Amphiliidae) from east and southern Africa

by

P. H. SKELTON

(Albany Museum, Grahamstown)

ABSTRACT

The taxonomy of *Amphilius* species from east and southern Africa is reviewed. A gross misidentification of *Amphilius platychir* (Günther) is exposed and corrected. *A. grammatophorus* is placed in synonymy with *A. platychir*. The name *A. uranoscopus* is recalled for the most common and widespread east and southern African *Amphilius* species. Distinguishing characters of *A. natalensis* Boulenger are identified and the species is shown to include the population of *A. lampei* from Zimbabwe. A new *Amphilius* species is recognized and described from the Buzi River in Mocambique.

INTRODUCTION

In the last revision of *Amphilius* from southern Africa Bell-Cross & Jubb (1973) recognized three species. *Amphilius platychir* (Günther, 1864), the most common species, occurs from the Pongola River in Natal northwards to central and east Africa (Fig. 1). *Amphilius natalensis* Boulenger (1917) is more restricted. It is distributed from the Umkomaas River northwards to the Incomati system and is present in the Marozi River a tributary of the Zambezi River arising in the Inyanga highlands of Zimbabwe (Bell-Cross & Jubb, 1973). *Amphilius lampei* Pietschmann (1913) was discovered isolated above a high waterfall in a short stretch of the Nyazengu River, a tributary of the Pungwe system in the eastern highlands of Zimbabwe. Prior to this *A. lampei* was only known from the type locality, a mountain stream near Harar in Ethiopia (Fig. 3).

Surveys of the eastwards flowing rivers of the Transvaal by the provincial nature conservation authorities in the late 1960's first revealed that *A. natalensis* was present in the Incomati and Pongola systems (Gaigher & Pott, 1972). The species was recently discovered in the Blyde River, a Limpopo tributary (Kleynhans, 1979), and the Ruo River, draining from Mount Mhlange in Malaŵi to the Lower Shire–Zambezi system (BMNH 1978. 12.13: 13–14). Both *A. natalensis* and *A. platychir* show a great deal of morphological variation and are easily confused in the field and, as the present investigation shows, by museum specialists as well. There is thus a need to investigate and expose more clearly the distinguishing characteristics of each species. Re-identification of museum samples indicates an extension of range of *A. natalensis*.

The most outstanding feature of *A. lampei* is the long low adipose fin confluent with the anterior ridge-like extension of the caudal fin (Bell-Cross & Jubb, 1973). The adipose fin varies considerably between *A. natalensis* populations and includes an *A. lampei* form in several of them. In view of this and other more definitive characters the identity of the Nyazengu *A. lam-*

pei is re-assessed in this paper. An unexpected outcome of the study is the discovery of an undescribed species from the lower reaches of the Buzi River in Mozambique.

These studies form part of a wider investigation of the phylogeny and biogeography of the family Amphiliidae. This broader study has involved, *inter alia*, the examination of the majority of available type specimens of amphiliid species. Several taxonomic discrepancies have been exposed in the process, the most serious involving the identity of *A. platychir*, the first amphiliid to be described. The paper considers and corrects the taxonomic record for the east and southern African *Amphilius* species.

Materials

The type specimens of nominal species connected with the taxonomy of southern African *Amphilius* (Table 1) were measured, examined and x-rayed. Additional material from the collections of the Albany Museum (AMSA) and National Museum of Zimbabwe [formerly Queen Victoria Museum (ZNM)] were also examined, measured and x-rayed (Appendix 1).

TABLE 1

Amphilius type specimens examined

Species	No. specimens examined	Reg. No.
Amphilius platychir	4	BM(NH) Not Registered
	1	MNHN 1898–121
Amphilius uranoscopus	2	NMH 11944
Amphilius leroyi	1	MNHN 1897–3
Amphilius grandis	3 (2)	BM(NH) 1904.12.23: 50–52
Amphilius hargeri	1	BM(NH) 1907.10.14: 8
Amphilius krefftii	2	BM(NH) 1909.10.19: 26–27
Amphilius oxyrhinus	1	BM(NH) 1912.3.22: 120
Amphilius grammatophorus	5	MNHN 1913–231–235
Amphilius brevidorsalis	1	MNHN 1919–488
Amphilius platychir cubangoensis	4	MNHN 1936–101–103. MRAC 138769
Amphilius natalensis	1	BM(NH) 1917.7.21: 1. Second specimen not traced
Amphilius lampei	1	NMW 48094 (Paratype; Holotype not traced)
Amphilius kivuensis	3	MNHN 1932–38/1933–9–11

Abbreviations:
BM(NH) — British Museum (Natural History).
MNHN — Museum National d'Historic Naturelle, Paris.
NMH — Naturhistorisches Museum, Hamburg.
NMW — Naturhistorisches Museum, Wien (Vienna).
MRAC — Museum Royale d'Afrique Centrale, Tervuren.

Methods

Linear measurements follow the methods of Skelton (1981). The additional measurement of 'Head to Dorsal fin' is taken from the posterior margin of the head to the anterior base of the dorsal fin. Vertebral counts were taken from radiographs according to Skelton (1976) except that all counts exclude 1–4 Weberian vertebrae. The first caudal vertebra was taken as that with a distinct haemal spine. Specimens were cleared and stained for bone and cartilage study according to the methods of Taylor (1967) and Taylor & Van Dyck (1979).

TAXONOMY AND IDENTITY OF *AMPHILIUS PLATYCHIR*

Günther (1864) described five smallish catfish specimens from Sierra Leone under the name of *Pimelodus platychir* (Fig. 1A). The following year Günther (1865) restricted *Pimelodus* to South America and renamed his African species *Amphilius platychir*. *Anoplopterus uranoscopus*, a somewhat similar species, was described much later by Pfeffer (1889) from the Wami and Pangani River in Tanzania (Fig. 1B). Pfeffer (1896) overlooked Günther's (1865) generic change and brought *A. platychir* into the genus *Anoplopterus*. Vaillant (1897) described a third species, *Chimarrhoglanis leroyi*, from Tanzania (Fig. 1C). Boulenger (1898) referred specimens from Nyasaland (now Malaŵi) to the species *A. platychir* and questioned Günther's (1864) statement that the types of the species were collected in Sierra Leone. Boulenger (1898) also synonymized Vaillant's *C. leroyi* with *A. platychir* and recognised Pfeffer's *A. uranoscopus*. Poche (1902b) drew attention to the priority of *Amphilius* as the correct name for the genus. Poche (1902a) and Günther (1902) refuted Boulenger's (1898) suggestion that the types of *A. platychir* were not from Sierra Leone.

Boulenger (1911) ignored these refutations in his influential catalogue and gave the distribution of *A. platychir* as "East Africa, westwards to Lake Tanganyika and Nyasa". Boulenger described several other *Amphilius* species from east Africa: *A. grandis* (1905) (Fig. 1D), *A. hargeri* (1907) (Fig. 1E), *A. kreffti* (1911) (Fig. 1F), and *A. oxyrhinus* (1912) (Fig. 1G). These were all very similar, differing only in minor proportions (Table 2) and have usually been dubiously recognized by authors (e.g. Harry, 1953; Bailey, 1969). Apart from some discussion of *A. hargeri* (see below) they are here considered to be synonyms of a single common widespread species from east and southern Africa.

Two species and one sub-species described by Pellegrin are also implicated in the taxonomy of *A. platychir*. Pellegrin (1913, 1919) described *A. grammatophorus* from the Konkoure River in French Guinea (Fig. 1H) and *A. brevidorsalis* from the Revue River (Buzi River system) in Mocambique (Fig. 1I). The subspecies *Amphilius platychir cubangoensis* was described from the 'Cubango' or Okavango River in Angola by Pellegrin (1936) (Fig. 1J).

Crass (1960) and Jubb (1961) followed Van der Horst (1931) who referred specimens from Transvaal rivers to *A. grandis*, but Jackson (1961), Crass (1964), Jubb (1967) and Bell-Cross & Jubb (1973), all probably under the influence of Boulenger's (1911) catalogue, considered the species to be *A. platychir* (see Bell-Cross & Jubb, 1973). Following Jubb (1967) and Bell-Cross & Jubb (1973) the common species of southern Africa is therefore currently accepted as being *A. platychir*. Elsewhere the species was also usually referred to as *A. platychir* (e.g. Poll, 1953, 1967, 1976; David & Poll, 1937; Ricardo, 1939; de Kimpe, 1964; Marlier, 1954; Matthes, 1967).

Apart from the type specimens and the collection referred to by Poche (1902a) *A. platychir* has not been reported from West Africa. Only a single specimen in the British Museum collection (BMNH 1968. 9.17: 3) from Sierra Leone has been subsequently referred to *A. platychir*. The 'common' *Amphilius* from this region in West Africa is identified and generally referred to *A. grammatophorus* (e.g. Norman, 1932; Daget, 1962; Daget & Iltis, 1965).

In view of Günther's (1902) public assertion that the type locality of *A. platychir* is Sierra

Fig. 1. Type localities of certain *Amphilius* species and range of *A. uranoscopus* (see text). Type localities

(A) *A. platychir* (Günther);
[B] *A. uranoscopus* (Pfeffer);
[C] *A. leroyi* (Vaillant);
[D] A. grandis Boulenger;
[E] *A. hargeri* Boulenger;
[F] *A. krefftii* Boulenger;
[G] *A. oxyrhinus* Boulenger;
(H) *A. grammatophorus* Pellegrin;
[I] *A. brevidorsalis* Pellegrin;
[J] *A. platychir cubangoensis* Pellegrin.

Stippled area represents range of species herein recognized as *A. uranoscopus* (Pfeffer).

Leone the identity of the species in east and southern Africa is clearly in dispute. Close examination of the type specimens revealed an unequivocal character of the caudal fin which places beyond doubt the true identity of *A. platychir* as a west African species. The caudal fin of the type specimens of *A. platychir* has only 6 + 7 principal rays and features a prominent crenellated fold along the base on either side (Table 2; Fig. 2). All east and southern African *Amphilius* sp. have 8 + 9 principal rays and do not have a flap or fold along the base. Although this flap of skin has been reported for certain *Amphilius* sp. (e.g. Trewavas, 1936), it has generally been overlooked or neglected as a character in *Amphilius* descriptions. The flap is characteristic of most west African *Amphilius* sp., certainly of all species known from the Sierra Leone region, a fact which vindicates Günther's opinion and disproves Boulenger (1898) and subsequent authors who record *A. platychir* from east and southern Africa.

There is consequently a problem as to the correct name for the several nominal species from east and southern Africa (Fig. 1). The usual choice of authors has been *A. grandis* but, as shown above, at least two east African species were described prior to *A. grandis*, namely *A. uranoscopus* Pfeffer (1889) and *A. leroyi* Vaillant (1897). *A. uranoscopus* has always been held distinct by authors (e.g. Boulenger, 1911; Harry, 1953; Bailey, 1969) mainly on account of its, as described, relatively small head ($\frac{SL}{HL}$ = 5,3 v. 4,3 in *A. platychir*). *A. leroyi* on the other hand was made a junior synonym of "*A. platychir*" from an early date by Boulenger (1898) and subsequently widely accepted as such (e.g. Poche, 1902; Boulenger, 1911; Harry, 1953). When judged from the original description (Pfeffer, 1889) and later figure (Pfeffer, 1889) and later figure (Pfeffer, 1896; Boulenger, 1911) the type specimen of *A. uranoscopus* is apparently distinct on the basis of head size from that of *A. platychir* and *A. leroyi*. However, there is an important discrepancy between the type specimen and Pfeffer's description. Pfeffer (1896) stated that the headlength was contained 5,3 times in the body length *without* the caudal fin. The present author's measurements of the type specimen (Table 2) give the head length as contained 4,2 times in the standard length. Several other measurements taken also disagree with Pfeffer's (1889; 1896) descriptions, e.g. the nares are approximately once the orbit diameter apart (not twice), the posterior nare is nearer the end of the snout than the anterior border of the eye. The examination of the type of *A. uranoscopus* (Table 2) indicates clearly that it is the same species as *A. leroyi, A. grandis* and other nominal east African forms. By the law of priority therefore the correct name for this species is *Amphilius uranoscopus* (Pfeffer, 1889).

In the original description of *Amphilius grammatophorus*, Pellegrin (1913) drew attention to the close affinities this species had with Günther's *A. platychir*. Pellegrin considered the two species to differ in the position of the dorsal fin (the hind margin anterior to the origin of the pelvics in *A. platychir*, the hind margin over the origin of the pelvics in *A. grammatophorus*), the slightly shorter maxillary barbel in *A. platychir* and the relatively shorter caudal peduncle in *A. platychir* (C.P. "a little longer than deep in *A. platychir*" and 1,75–2 times longer than deep in *A. grammatophorus*).

A morphometric and meristic comparison of the type specimens of these species is given in Table 2. This comparison is offset to a certain degree by the difference in overall size of the two sets of types (SL range of *A. platychir* 35,5–44,1 mm; 56–91,5 mm in *A. grammatophorus*). The differences between the types are not marked and in most eases are not diagnostic. Possibly the clearest differences are the predorsal distance, head width and preanal vertebrae. The longer predorsal length of *A. platychir* does not correlate with any clear vertebral difference at least in the predorsal part of the vertebral column. In general body and fin ray characteristics including the caudal fin and the associated fleshy flap described above, the types of the two species are similar. The types of *A. grammatophorus* do have a greater number of gill rakers than those of *A. platychir*. The age and condition of the types of *A. platychir* could well be

TABLE 2

Comparison of morphometric and meristic characters of the types of *Amphilius platychir* (Günther) and *Amphilius grammatophorus* Pellegrin.

CHARACTER	*A. platychir* $\bar{M}$	N=5 Range	*A. grammatophorus* $\bar{M}$	N=5 Range
Measurements				
Standard length (mm)		35,5–44,1		56,0–91,5
As % Standard length				
Predorsal length	42,0	41,2–43,7	37,4	36,6–38,5
Head length	24,7	23,2–25,9	22,2	20,4–24,3
Head depth	10,4	9,3–12,1	10,0	9,2–11,1
Head width	21,5	20,7–22,5	19,6	18,7–20,6
Body depth	11,6	10,7–13,5	14,3	12,5–16,6
Body width	15,3	13,6–16,0	15,5	14,1–16,7
Caudal peduncle length	16,6	15,1–17,7	18,0	16,8–19,5
Caudal peduncle depth	10,2	9,3–10,6	9,1	8,4– 9,6
Dorsal fin length	20,8	18,1–21,8	20,0	19,1–21,4
Anal fin length	18,6	17,6–19,3	17,7	16,4–18,2
Pectoral fin length	22,2	21,3–22,8	19,3	18,3–20,3
Pelvic fin length	20,2	19,0–21,1	18,0	17,1–18,6
As % Head length				
Snout	51,3	49,5–53,2	55,4	51,8–58,5
Orbit	12,1	10,3–14,9	10,9	9,4–12,3
Interorbit	32,2	29,4–34,8	33,7	31,4–35,0
Postorbit	42,3	41,3–43,6	39,9	38,5–41,4
Maxillary barbel	80,1	70,9–90,4	86,3	76,6–98,5
Mandibular barbel (inner)	34,3	30,9–39,4	47,4	40,1–53,8
Mandibular barbel (outer)	54,9	50,6–57,8	68,8	61,3–76,4
Fin Ray Counts				
Dorsal fin	i,5(1); i,6(4)		i,6(5)	
Anal fin	ii,5(2); ii,6(3)		ii,6(4); ii,7(1)	
Pectoral fin	i,8(2); i,9(3)		i,8(5)	
Pelvic fin	1,5(5)		i,5(5)	
Caudal fin	6 + 7(5)		6 + 6(1), 6 + 7(2)	
Gill rakers (Ant. Arch)	2 + 4(1); 2 + 6(1); 1 + 6(1); 2 + 7(1)		2 + 8(4); 4 + 7(1)	
*Vertebral Counts**				
Total vertebrae	33(2), 35(3)		34(5)	
Precaudal vertebrae	14(1), 15(3), 16(1)		13(2), 14(3)	
Caudal vertebrae	18(1), 19(2), 20(2)		20(3), 21(2)	
Predorsal vertebrae	3(3), 4(2)		4(5)	
Preanal vertebrae	21(4), 22(1)		18(1), 19(4)	
Hypural pattern	Ph+1+2−3+4−5+6(3)		Ph+1+2−3+4−5+6(5)	

*Vertebral counts exclude 1–4 Weberian vertebrae.

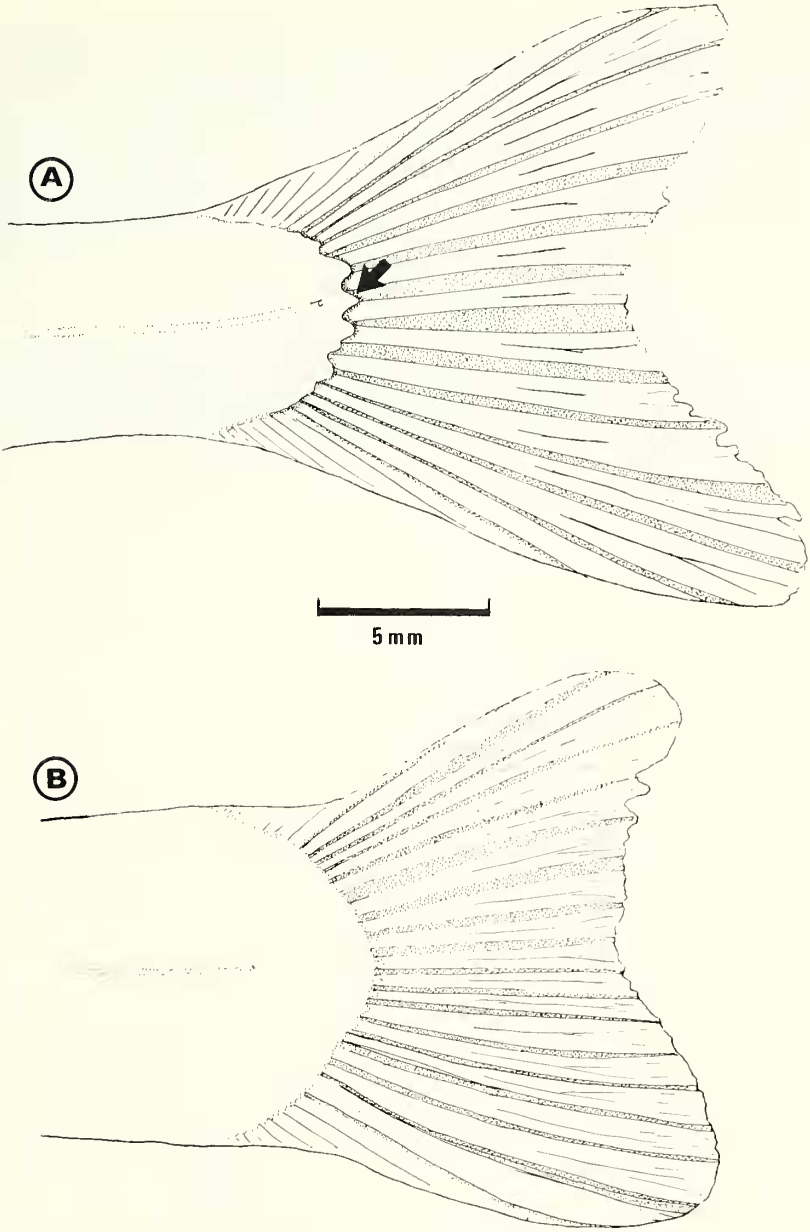


Fig. 2. Caudal fin of A) *Amphilius platychir* (AMSA/P 9559) from Konkoulo à Pita, Guinea collected by C. Leveque 28.04.1980R, and B) *Amphilius uranoscopus* (AMSA/P 6207) from Olifants River, Limpopo River system. Arrow indicates crenellated flap characteristic of west African *Amphilius* species including the types of *A. platychir*.

a factor influencing the measurements and it is not easy to make a clear taxonomic decision. This is aggravated by the paucity of available specimens of *A. platychir* from west Africa. In spite of the above mentioned differences between the types there remains little reasonable doubt that *A. grammatophorus* is a junior synonym of *A. platychir*.

THE STATUS OF *AMPHILIUS LAMPEI* IN SOUTHERN AFRICA

The recording of *Amphilius lampei* from the Nyazengu River, a tributary of the Pungwe system near Inyanga in eastern Zimbabwe, by Bell-Cross & Jubb (1973) was certainly one of the most surprising and difficult-to-explain ichthyological discoveries from the sub-continent. As pointed out by Bell-Cross & Jubb (1973) the type locality near Harar in Ethiopia is likely to be a tributary of the Webi Shebeli system (Fig. 3).

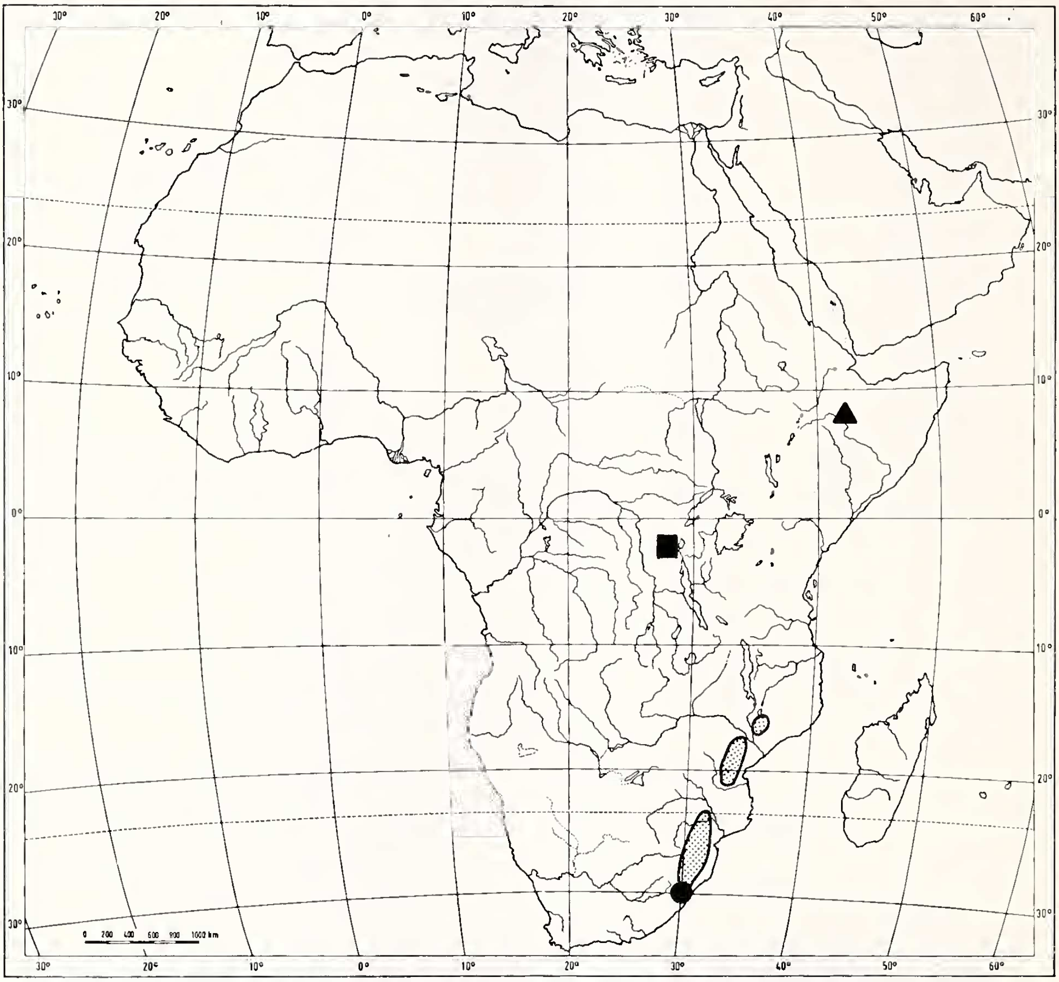


Fig. 3. Type localities of certain *Amphilius* species: ▲ *Amphilius lampei* Pietschmann; ■ *Amphilius kivuensis* Pellegrin; ● *Amphilius natalensis* Boulenger. Stippled area indicates distribution of *A. natalensis*.

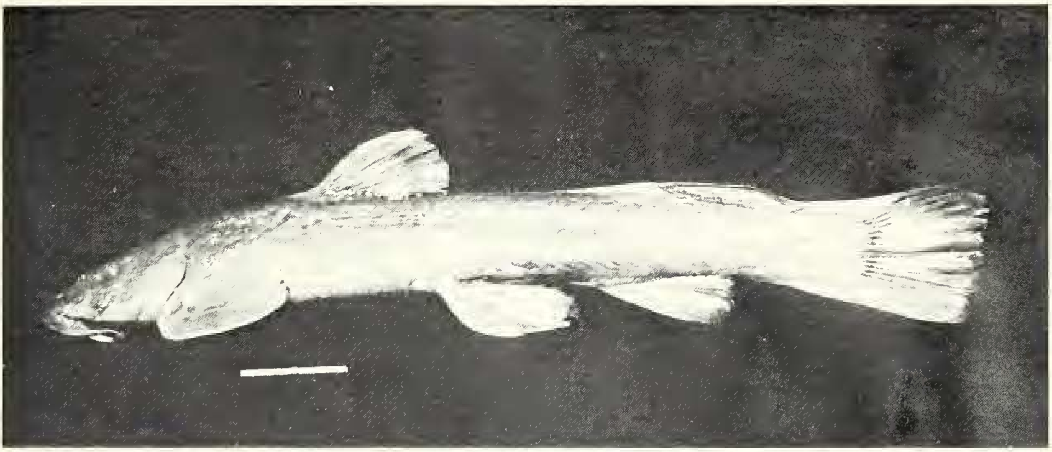


Fig. 4. Paratype of *Amphilius lampei* Pietschmann (NMW 48094; SL 76 mm). (Holotype and only other known specimen of this species from type locality is missing, presumably lost during World War II). Scale bar = 1 cm.

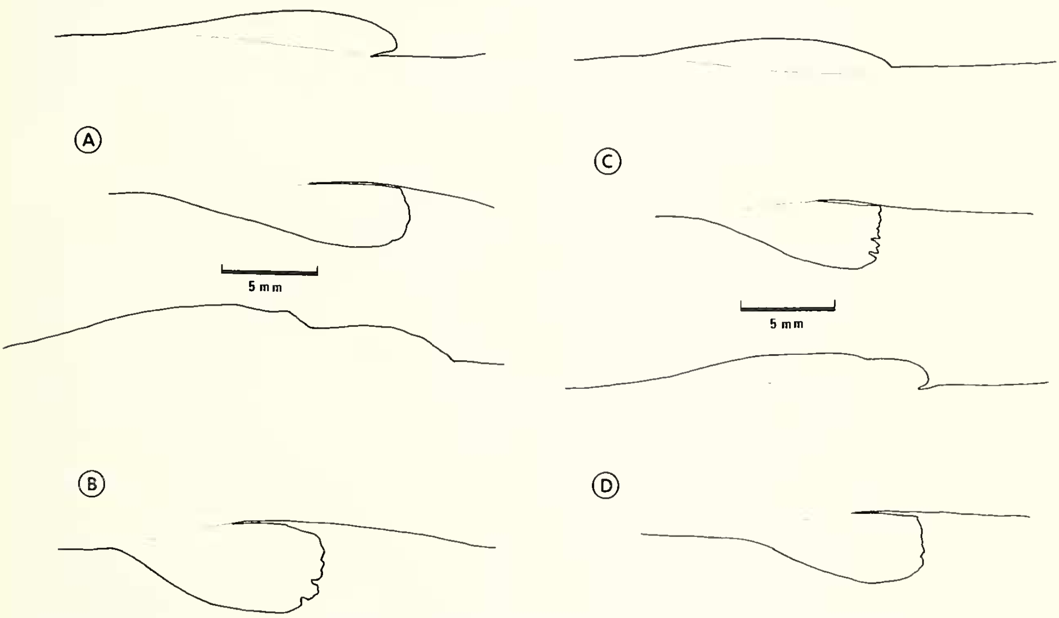


Fig. 5. Form of adipose fin in *Amphilius*: A) *A. natalensis* from the type locality, Umgeni River at Krantzkloof (AMSA/P 9557); B) *A. natalensis* from Nyazengu River, Pungwe system, Zimbabwe (*A. lampei sensu* Bell-Cross and Jubb, 1973) (Q.V.M. 2743); C) *A. natalensis* from Pungwe River (AMSA/P 5814); D) *A. uranoscopus* from Pungwe River (AMSA/P 5814).

A key feature of *A. lampei* is the long low confluent adipose fin (Fig. 4). In this the Nyazengu population was shown to differ markedly from the short adipose with a distinct posterior 'nick' or notch of *A. uranoscopus* (= "*platychir*") found elsewhere in the Pungwe system (Fig. 5D). At the time Bell-Cross & Jubb (1973) did not realize that both *A. uranoscopus* and *A. natalensis* occur in the Pungwe River below the Nyazengu waterfall (see also Bell-Cross, 1976; Bowmaker *et al.*, 1978). However, examination of collections in the Albany Museum (Appendix 1) shows that both species are present in the Pungwe. The adipose fin of *A. natalensis* from the Pungwe (Fig. 5C) is low and not nicked like that of *A. uranoscopus* (Fig. 5D).

This discovery of *A. natalensis* in the Pungwe and the fact that there was no great difference between the adipose fin of *A. natalensis* and that of *A. lampei* necessitated a comparison of the two species. However, before doing this the taxonomic weight which has previously been given to the form of the adipose fin in amphiliids (e.g. discussions by Pietschmann, 1973; Barnard, 1942; Harry, 1953; Bell-Cross & Jubb, 1973) requires that further detail be provided on the form of the fin in *A. natalensis*.

In Natal populations the adipose fin in adult *A. natalensis* is short and has a posterior 'nick' as shown in Fig. 5A, and in published photographs and figures (Jubb, 1967 Fig. 168; Bell-Cross & Jubb, 1973 Fig. 1; Fowler, 1934 Fig. 3). In the Pongola system and rivers to the north the adipose fin does not have a free posterior edge but is more or less confluent with the anterior extension of the fleshy caudal fin fold. In some populations e.g. those of the Blyde and Mtarazi rivers, the adipose fin is relatively long and extremely similar to the form it takes in the Nyazengu "*A. lampei*" (Fig. 5D) and the type specimen of *A. lampei* (Fig.4). Thus, this character cannot be used to distinguish Nyazengu *Amphilius* from *A. natalensis*. Further the Nyazengu *Amphilius* agrees in other diagnostic characters of *A. natalensis* (see below) indicating that only one species is involved. The real issue raised by these observations is therefore the identity of *A. natalensis (sensu lato)* and *A. lampei (sensu stricto)* in relation to each other. This issue is considered below after a clearer distinction between *A. uranoscopus* and *A. natalensis* has been made.

CHARACTER COMPARISON OF *AMPHILIUS URANOSCOPUS* AND *AMPHILIUS NATALENSIS*

Amphilius natalensis is usually reported to have a smaller head, to be more slender and to have the dorsal fin further back than does *A. uranoscopus* (Crass, 1964; Jubb, 1967; Bell-Cross & Jubb, 1973). Testing these characters (Figs 6, 7, 8, 9) indicates that the species differ as reported but that there is an overlap in range for all the measurements which reduces their absolute diagnostic value. Much of the confusion between the species evidently arises from the fact that workers tend to consider misleading proportions e.g. head width relative to head length (Fig. 10) or body width relative to body depth (Fig. 11). Contrary to the literature, the position of the dorsal fin as measured by the predorsal distance (Fig. 12) is the same for both species. What does differ, and is diagnostic, is the position of the dorsal fin relative to the hind margin of the head (Fig. 13).

Crass (1964) provided a key to distinguish the two species using a difference in head length relative to the distance between the head and the dorsal fin. In *A. uranoscopus* the length of head was given as 1,6–2 times the distance from gill opening to the anterior edge of the dorsal fin. In *A. natalensis* head length is 1,1–3 times this same distance. Crass' (1964) criterion, upheld here as probably the most clear external difference between the two species (Fig. 13), appears to have been overlooked by subsequent authors reporting southern African *Amphilius* species.

The significance of this character is stressed because of a clear skeletal difference underlying the external dimensions (Fig. 14). In *A. uranoscopus* the leading pterygiophore of the dorsal fin intercepts the vertebral column at the first, second or third post-Weberian vertebrae

TABLE 3

Morphometric ratios and meristic characters of type specimens of certain nominal East and Southern African *Amphilius* species

Character	*A. uranoscopus* (2)	*A. leroyi*	*A. grandis* (2)	*A. krefftii* (2)	*A. oxyrhinus*	*A. hargeri*	*A. brevidorsalis*
Measurements							
Standard length (mm)	117,5–124	118,0	137–162	47–87	167	48,5	43
As % Standard length							
Predorsal length	35,7; 36,5	34,7	34,6 ; 38	36,2 ; 33,8	38,3	41,2	37,7
Head length	23,8; 22,6	22,9	24,1 ; 25,5	21,9 ; 21,4	25,2	24,7	24,7
Head depth	10,0; 9,4	10,5	12,8 ; 13,0	13,2 ; 12,0	11,5	12,8	13,3
Head width	22,8; 20,8	22,2	23,4 ; 23,5	21,3 ; 20,8	22,2	22,7	21,4
Head length/Head to dorsal (Not % SL)	1,7; 1,5		1,84; 1,56	1,58; 1,55	1,75	1,3	1,56
Body depth	12,9; 12,1	15,8	15,7 ; 16,0	12,3 ; 12,6	12,9	14,4	15,6
Body width	18,7; 16,5	18,6	14,7 ; 17,2	15,1 ; 15,6	15,6	17,5	16,3
Caudal Peduncle length	18,5; 16,8	17,4	18,6 ; 19,5	18,3 ; 19,5	18,6	19,4	20,7
Caudal Peduncle depth	12,3; 11,9	11,9	9,9 ; 10,1	10,6 ; 11,5	9,3	11,1	10,7
Dorsal fin length	21,4; 18,6	17,5	15,0 ; 15,7	18,7 ; 17,9	15,6	21,4	20,0
Anal fin length	16,6; 17,7	16,1	12,0 ; 13,5	16,4 ; 16,3	16,2	18,6	16,7
Pectoral fin length	20,4; 20,3	19,9	16,8 ; 18,2	21,9 ; 19,7	18,6	22,1	21,7
Pelvic fin length	20,6; 18,9	18,3	14,5 ; 17,2	20,2 ; 19,0	15,6	20,4	19,8
As % Head length							
Head to dorsal 1.	14,0; 14,9		13,9 ; 15,4	13,8 ; 13,8	14,4	18,6	18,0
Snout	51,4; 54,3	54,1	51,3 ; 54,3	48,5 ; 50,5	52,9	50,8	47,2
Orbit	11,1; 9,6	11,5	11,5 ; 12,0	15,5 ; 11,3	9,5	10,8	11,3
Interorbit	25,7; 25,7	27,4	25,7 ; 29,0	30,1 ; 24,7	23,8	35,0	34,9
Postorbit	41,1; 42,9	40,7	41,0 ; 41,4	40,8 ; 41,4	41,9	46,7	42,5
Maxillary barbel	107,2; 82,1	96,3	51,0 ; 58,2	87,4 ; 91,4	59,5	116,7	78,3
Mandibular barbel (inner)	42,9; 35,7	50,0	28,6 ; 32,1	29,1 ; 37,6	32,1	49,2	30,2
Mandibular barbel (outer)	71,4; 71,4	68,5	41,0 ; 41,4	55,3 ; 59,1	45,2	83,0	49,1
As % Snout length							
Orbit to Post. nare	45,1; 49,3	54,8		48,0 ; 52,1	47,7		40,0
Post. nare to Ant. nare	15,3; 19,7	23,3		32,0 ; 26,6	19,4		24,0
Ant. nare to mid. snout	38,2; 32,9	41,1		38,0 ; 35,1	38,7		
Fin Ray Counts							
Dorsal fin	i,6; i,6	i,6	i,6; i,6	i,6; i,6	i,6	i,6	i,5
Anal fin	iii,6; iii,7	ii,6	iii,6; iii,6	ii,5; ii,7	iii,5	i,6	iii,5
Pectoral fin	1,10; 1,10(9)	1,10	1,10; 1,10	1,10; 1,10	1,10	1,10	1,10
Pelvic fin	1,5 ; 1,5	1,5	1,5 ; 1,5	1,5 ; 1,5	1,5	1,5	1,5
Caudal fin	8 + 9; 8 + 9	8 + 9	8 + 9; 8 + 9	8 + 9; 8 + 9	8 + 9	8 + 9	8 + 9
Gill rakers (ant. areh)	3 + 5; 3 + 6	4 + 7	3 + 7	1 + 6; 1 + 6	2 + 7	3 + 6	3 + 5
Vertebral Counts							
Total vertebrae	39; 38	36	38; 39	38	38	37	37
Precaudal vertebrae	16; 16	16	16; 17	16	17	16	16
Caudal vertebrae	23; 22	20	21; 23	22	21	21	21
Predorsal vertebrae	1; 0	2	2; 2	2; 2	2	3	0
Preanal vertebrae	22; 21	20	22; 22	21; 21	22	22	21

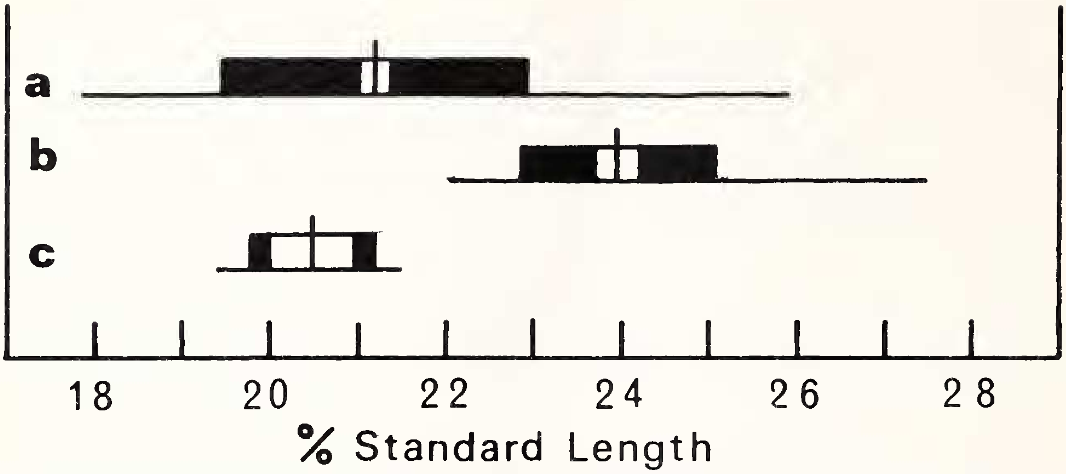


Fig. 6. Head length as % Standard length of (a.) *A. natalensis* (N=87) and (b.) *A. uranoscopus* (N=70) from different localities in southern Africa, and (c.) *A. natalensis* (= *A. lampei*) from Nyazengu River, Zimbabwe (N=10).

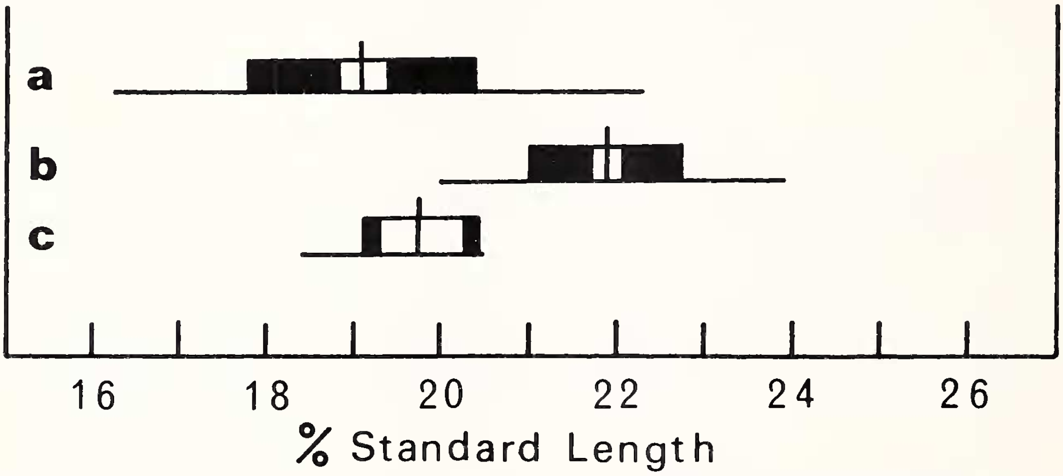


Fig. 7. Head width as % Standard length of (a.) *A. natalensis* (N=87); (b.) *A. uranoscopus* (N=70) from different localities in southern Africa, and (c.) *A. natalensis* (= *A. lampei*) from Nyazengu River, Zimbabwe (N=10).

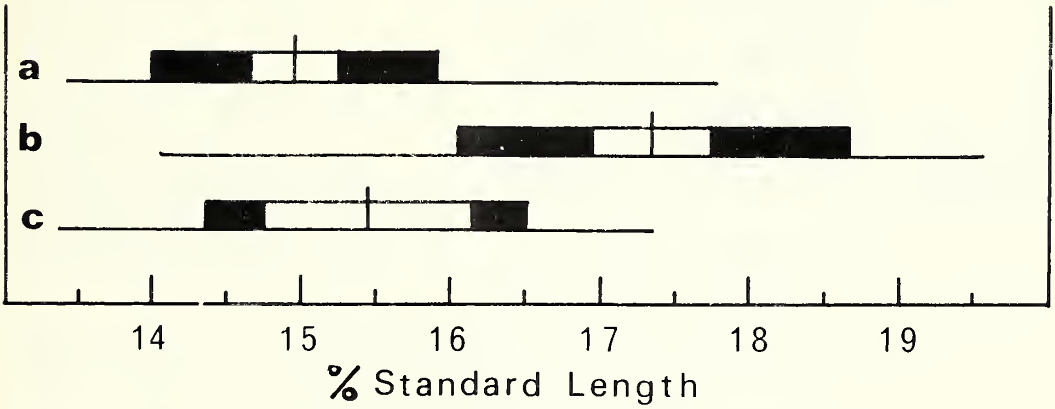


Fig. 8. Body width as % Standard length of (a.) *A. natalensis* (N=40); (b.) *A. uranoscopus* (N=44) from different localities in southern Africa and (c.) *A. natalensis* (= *A. lampei*) from Nyazengu River, Zimbabwe (N=10).

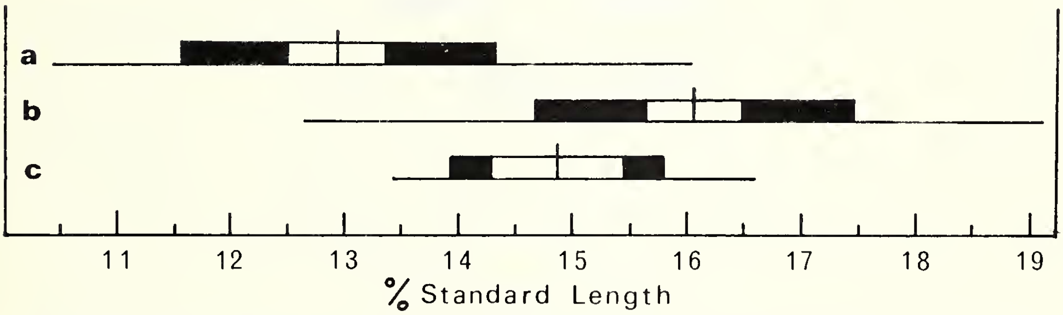


Fig. 9. Body depth as % Standard length of (a.) *A. natalensis* (N=40); (b.) *A. uranoscopus* (N=44) from different localities in southern Africa and (c.) *A. natalensis* (= *A. lampei*) from Nyazengu River, Zimbabwe (N=10).

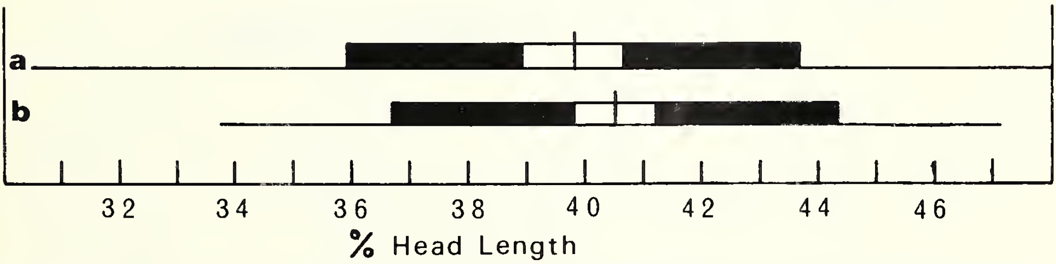


Fig. 10. Head width as % Head length of (a.) *A. natalensis* (N=87) and (b.) *A. uranoscopus* (N=70) from different localities in southern Africa.

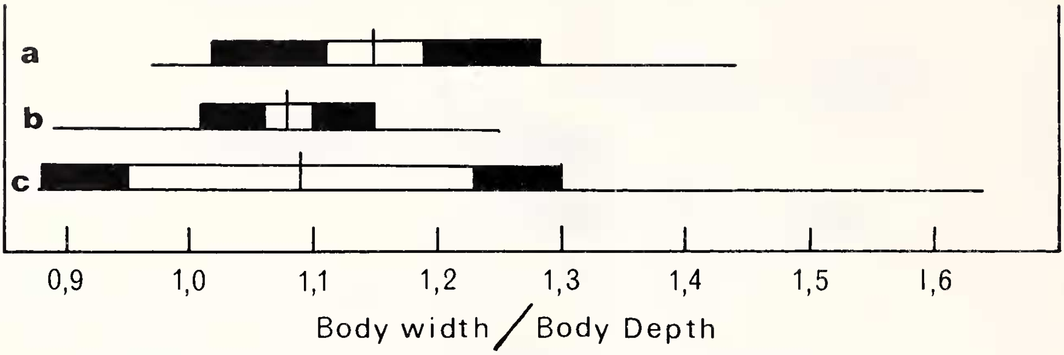


Fig. 11. Body width proportional to Body depth of (a.) *A. natalensis* (N=40); (b.) *A. uranoscopus* (N=44) from different localities in southern Africa and (c.) *A. natalensis* (N=10) from Nyazengu River, Zimbabwe.

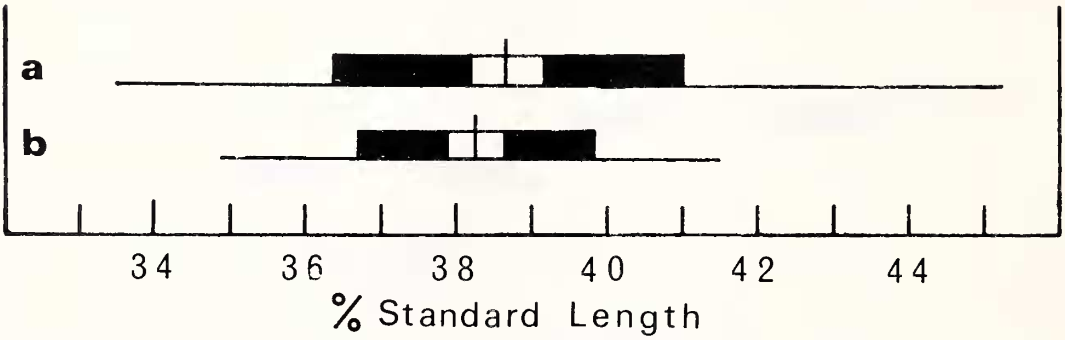


Fig. 12. Predorsal length as % Standard length for (a.) *A. natalensis* (N=87) and (b.) *A. uranoscopus* (N=70) from different localities in southern Africa.

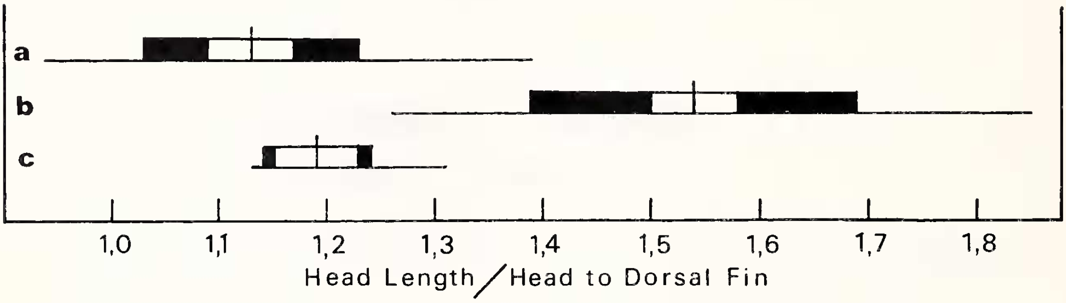


Fig. 13. Head length proportional to the distance between the head and dorsal fin of (a.) *A. natalensis* (N=40); (b.) *A. uranoscopus* (N=44) from different localities in southern Africa, and (c.) *A. natalensis* (= *A. lampei*) (N=10) from Nyazengu River, Zimbabwe.

(Fig. 14A, Table 5). By contrast there are four or five post-Weberian, pre-dorsal vertebrae in *A. natalensis* and, in support of the proposed synonymy, also in the upper Nyazengu *Amphilius* (Fig. 14B, Table 4).

There is an element of geographic variation in where the dorsal fin intercepts the vertebral column in *A. uranoscopus* (Table 4). In the type specimen as well as specimens from the Zambezi, Okavango, Pungwe and Save rivers, the first dorsal pterygiophore usually meets the first post-Weberian vertebra whereas in most other populations examined this pterygiophore meets the second or third post-Weberian vertebra. It is also noteworthy that in both the Save and the Limpopo systems different samples gave different results in this count. This suggests either divergent morphological trends within the systems or diverse origins of the stocks.

Table 4

Geographic variation in the distribution frequency of predorsal vertebrae* of *A. uranoscopus* and *A. natalensis* in southern Africa.

*excludes the 1–4 vertebrae of the Weberian complex.

		N	0	1	2	3	4	5	6
A. *Amphilius uranoscopus*									
Zambezi	Ruo	13			12	1			
	Gairezi	2	2						
	Okavango	25		24	1				
Pungwe		2		2					
Save	Sabi	10		10					
	Lundi	12			4	8			
Limpopo	Ndezele	3				3			
	Mooketzi	22				22			
	Steelpoort	9		9					
Pongola		11		1	7	3			
		109	2	46	24	37			
B. *Amphilius natalensis*									
Zambezi	Ruo	2				1	1		
	Gairezi	8				1	6	1	
Pungwe	Pungwe	13						13	
	Nyazengu	14					2	12	
Limpopo	Blyde	11						3	8
Incomati	Lunsklip	10						10	
	Incomati	6						3	3
Tugela	Ngogo	10						7	3
	Mweni	4					1	3	
	Mooi	9						9	
Umgeni	Krantzkloof	6						2	4
		93				2	10	63	18

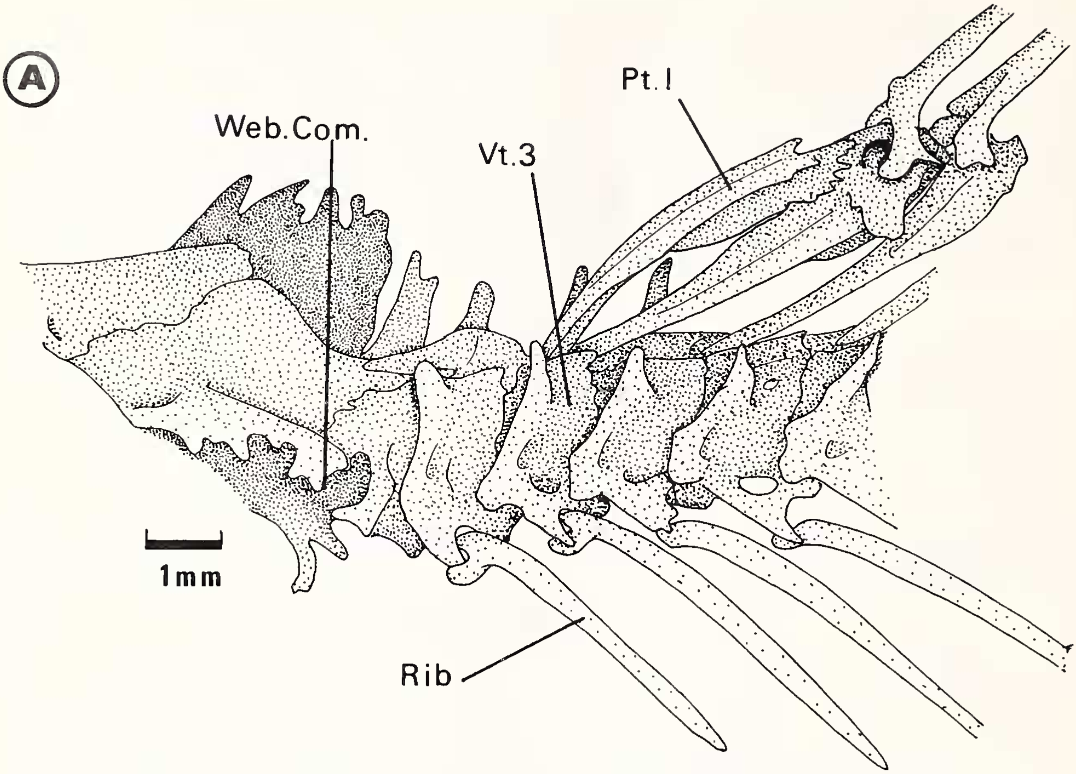
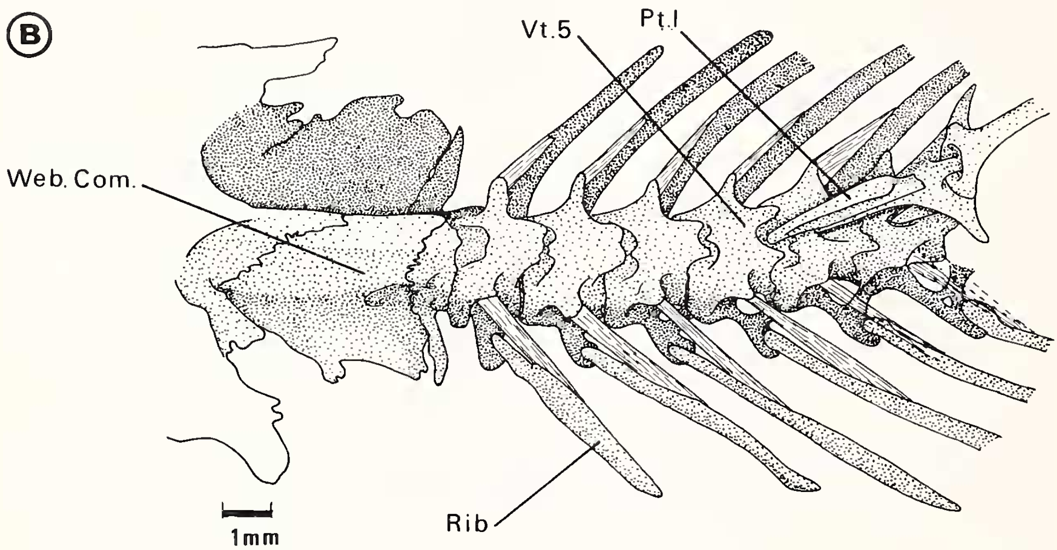


Fig. 14. A) Lateral view of portion of the skeleton of *A. uranoscopus* (AMSA/P 672) in the region between the head and the dorsal fin.



B) Latero-dorsal view of portion of the skeleton of *A. natalensis* (AMSA/P 895) in the region between the head and the dorsal fin.

TABLE 5

Distribution frequency of vertebral counts of *Amphilius* species in southern Africa. (Counts exclude 1–4 Weberian vertebrae).

A.	*Total Vertebrae*	N	36	37	38	39	40	
	A. natalensis	93	6	27	28	27	5	
	A. uranoscopus	109	9	37	42	20	1	
B.	*Precaudal Vertebrae*	N	15	16	17	18		
	A. natalensis	93	13	42	31	7		
	A. uranoscopus	109	3	54	48	4		
C.	*Caudal Vertebrae*	N	19	20	21	22	23	24
	A. natalensis	93		6	41	40	5	1
	A. uranoscopus	109	1	16	60	25	7	
D.	*Pre-anal Vertebrae*	N	20	21	22	23	24	
	A. natalensis	93	5	27	46	14	1	
	A. uranoscopus	109	12	46	44	7		

There are no clear differences in other vertebral meristic characters (Table 5A-D) between the two species. The pattern of hypural fusion in the caudal skeleton (Table 6A, B) indicates a wide variation for both species and a certain degree of overlap. The variation is more marked for *A. uranoscopus* in which a maximum of 26,7% of the specimens examined had any one particular pattern of hypural fusion (ph − 1 + 2 − 3 + 4 − 5 + 6). By contrast 63,5% of *A. natalensis* specimens had the same pattern of hypural fusion (ph − 1 + 2 − 3 + 4 − 5 + 6). It is clearly evident from Table 6 that *A. natalensis* exhibits a much greater degree of fusion of the hypurals than does *A. uranoscopus*. Nearly all *A. natalensis* have the parhypural fused with hypurals one and two but only 35% of *A. uranoscopus* show this. *A. natalensis* consistently has a higher percentage frequency than *A. uranoscopus* for each element of hypural fusion considered independantly (Table 6B). Externally the caudal fin of *A. natalensis* is usually more deeply forked than that of *A. uranoscopus*, however, this is not consistent and cannot be used as a diagnostic feature.

The general osteology of the two species was also studied but, apart from those mentioned above, no trenchant differences have been detected.

Both *A. natalensis* and *A. uranoscopus* have a notoriously variable range of pigmentation (Jubb, 1967). This intraspecific variation can exist within or between populations in the same river system. Pigmentation patterns include a plain dark grey or brown with lighter 'saddles' before and behind the dorsal, adipose and caudal fins, or the same with fine, medium or large spots, or a marbled or mottled arrangement which itself can vary in contrast. Certain populations are reasonably characteristic in pigmentation e.g. the only population of *A. natalensis* in the Blyde River is uniform dark brown, almost black and all specimens of *A. uranoscopus* from the Kavango River are heavily mottled. As yet no correlation with habitat type is evident and indeed collections from single localities can show a large range of pigment form so that the possibility of any correlation seems doubtful.

TABLE 6

Intraspecific variation in caudal skeleton structure of *Amphilius uranoscopus* and *Amphilius natalensis* from southern Africa. (Ph – parhypural; + – fused, – not fused, hypural bones numbered 1 to 6 from ventral to dorsal).

A. FREQUENCY OF PATTERN OF HYDURAL FUSION

	N	Ph−1+2−3−4−5−6	Ph−1+2−3+4−5−6	Ph−1+2−3+4−5+6	Ph−1+2−3−4−5+6	Ph+1+2−3−4−5−6	Ph+1+2−3+4−5−6	Ph+1+2−3+4−5+6	Ph+1+2−3−4−5+6	Ph+1+2+3+4+5+6
A. uranoscopus	60	9	16	4	10	4	13	2	2	
% frequency		15	26,7	6,7	16,7	6,7	21,7	3,3	3,3	
A. natalensis	63			1		1	12	40	6	3
% frequency				1,6		1,6	19	63,5	9,5	4,8

B. Degree of fusion of hypural elements in the caudal skeleton of *A. uranoscopus* and *A. natalensis* from southern Africa.

HYPURAL PATTERN

	N	Ph−1+2	Ph+1+2	3−4	3+4	5−6	5+6
A. uranoscopus	60	39	21	25	35	42	18
%frequency		65	35	41,6	58,3	70	30
A. natalensis	63	1	62	7	56	13	50
% frequency		1,6	98,4	11,1	88,9	20,6	79,4

COMMENTS ON THE TAXONOMIC STATUS OF *A. LAMPEI*, *A. NATALENSIS* AND RELATED SPECIES

The conclusion reached above on the status of the Nyazengu *Amphilius* immediately raises the question of the taxonomic status of *A. natalensis* Boulenger and *A. lampei* Pietschmann. Examination of the only available paratype of *A. lampei* (NMW 48094; Fig. 4) provides a basis for answering this question. *A. lampei* was described from two specimens both originally in the

Wiesbaden Museum (Pietschmann, 1913). Neither of these specimens was found, when requested for this study, and they were presumed lost in World War II (Dr R. Mentzel *in litt*). Fortunately the paratype appears to have been sent to the Vienna Natural History Museum before the war and was found there during a visit by the author in September 1981.

Several proportional measurements of the *A. lampei* paratype and the 'topotypes' of *A. natalensis* do not exactly coincide (Table 7) but are comparably similar considering the few specimens in either sample. Indeed in several characters, for which a large number of specimens of *A. natalensis* was measured (for comparison with *A. uranoscopus* in previous section), the range easily encompasses that of the paratype of *A. lampei*. Differences, such as in the number of preanal vertebrae, are difficult to evaluate conclusively from the single paratype. As the two samples were taken from the extremes in the distribution of this species a few differences of this sort were to be expected. 'Handling' the type specimen of *A. lampei* and a wide range of *A. natalensis* specimens certainly leaves little doubt that they belong to the same morphological species.

The most northerly locality from which *A. natalensis* has been recorded is the Ruo River in Malaŵi (BMH 1978. 12.13: 13–14). The problem of the enormous geographical gap between this and the type locality of *A. lampei* in Ethiopia (Fig. 3) is not really answerable without considerably more detailed collections from the intervening rivers. The possibility of other known species within this range being synonymous has also been investigated. Based on the combined criteria of predorsal vertebrae and the number of caudal fin rays (8 + 9; see above 'identity of *A. platychir*') only one species, *A. kivuensis* Pellegrin 1933 is a possible candidate. The proportional measurements of three of the type specimens are given in Table 7 for comparison with those of the type of *A. lampei* and of topotypes of *A. natalensis*.

It is evident that there is a general morphometric similarity between the specimens in Table 7. The *A. kivuensis* types differ slightly in having a longer and broader head, shorter orbit diameter and longer postorbit than either *A. lempei* or *A. natalensis*. In the vertebral column *A. kivuensis* has a relatively high count which is reflected to some degree in both the precaudal and caudal counts. The differences are nevertheless not distinctive. In the caudal skeleton *A. kivuensis* differs in not having hypurals five and six fused. Poll (1953) and Brichard (1978) remark that the caudal fin is straight (i.e. truncate), rather than notched, in this species. Once again the data from the type specimens suggest that they belong to a single variable species. A formal synonymy is not proposed before a larger series of *A. kivuensis* specimens can be examined in detail.

The discovery of *A. natalensis* in the Ruo River requires a re-examination of the identity of *A. hargeri* Boulenger (1907) from this site. Barnard (1942) speculated that "*A. natalensis* could quite possibly be linked with the two Nyasaland species *A. platychir* and *A. hargeri*". However, this was before the southern African species were well known. Jubb (1967) and Bell-Cross (1973) considered *A. hargeri* to be a junior synonym of *A. platychir* (= *A. uranoscopus*) without apparently examining the type of the species. The single type of *A. hargeri* (Table 2) does not provide an absolute answer to the problem. In most measurements and characters the specimen agrees more closely with *A. uranoscopus* (*sensu lato*) than with *A. natalensis*. However, the head length to length from head to dorsal fin ratio is 1,35, much nearer the value given by Crass (1964) for *A. natalensis* (1,1–1,3) than to *A. platychir* (= *A. uranoscopus*) (1,6–2,0). The first dorsal pterygiophore intercepts the third post-Weberian vertebrum. Although pigmentation is a variable character, all *A. natalensis* examined have the lighter 'saddles' before and behind the dorsal fins as described for the type of *A. hargeri*. The caudal skeleton of *A. hargeri* is of a type unusual for *A. natalensis* as it is relatively unconsolidated. In this respect, a higher percentage of the *A. uranoscopus* featured the same pattern as *A. hargeri*. *A. natalensis* has been found in the Ruo River, however, only in the uppermost reaches (D. Tweddle pers. comm.). The ambiguous character of the type specimen of *A. hargeri* sug-

TABLE 7

Comparison of morphometric and meristic characters of the types of *Amphilius lampei* Pietschmann, *A. kivuensis* Pellegrin and topotypes of *Amphilius natalensis* Blgr.

CHARACTER	*A. lampei* (N=1)	*A. kivuensis* $\overline{M}$	(N=3) Range	*A. natalensis* $\overline{M}$	(N=6) Range
Measurements					
Standard length (mm)	76,0		60,0–88,0		47,0 – 74,7
As % Standard length					
Predorsal length	37,5	40,3	39,8–41,0	40,0	38,7 – 41,1
Head length	20,3	23,0	22,0–24,3	20,5	20,1 – 20,9
Head depth	10,5	11,8	11,3–12,5	11,7	10,6 – 13,6
Head width	17,5	21,7	20,5–23,1	19,3	18,1 – 20,4
Head length/Head to Dorsal (Not % SL)	11,3			10,4	0,94– 1,09
Body depth	13,9	14,3	13,0–15,6	13,8	12,3 – 15,4
Body width	15,1	16,1	15,8–16,5	14,8	14,0 – 15,8
Caudal pedunele length	21,7	19,2	17,8–20,5	19,4	18,2 – 21,3
Caudal peduncle depth	11,6	10,8	10,3–11,4	9,7	9,4 – 10,2
Dorsal fin length	17,4	18,9	18,7–19,3	19,7	17,5 – 21,3
Anal fin length	17,4	17,9	17,6–18,3	16,6	16,0 – 17,1
Pectoral fin length	19,7	20,8	20,5–21,1	21,5	19,8 – 22,3
Pelvic fin length	18,4	18,1	17,5–18,8	18,6	18,1 – 19,7
As % Head length					
Snout	53,2	49,1	46,6–52,9	55,8	51,1 – 61,3
Orbit	13,0	10,3	9,1–11,5	14,0	11,7 – 16,4
Interorbit	29,9	30,8	28,4–33,3	33,3	30,7 – 36,5
Postorbit	41,6	46,8	41,1–49,7	39,2	36,5 – 40,9
Maxillary barbel	58,4	94,4	83,6–100,9	94,2	84,5 –103,3
Mandibular barbel (inner)	39,0	39,2	30,8–43,6	33,9	26,6 – 38,7
Mandibular barbel (outer)	55,2	72,8	66,4–72,2	57,5	54,0 – 60,5
As % Snout length					
Orbit-post. nare	35,4	40,6	36,8–46,8	40,1	37,5 – 45,0
Post, nare-ant. nare	30,5	24,7	22,7–27,8	28,4	23,7 – 30,0
Ant. nare-mid snout	43,9	41,8	39,7–45,6	40,3	34,3 – 44,7
Fin Rays					
Dorsal fin	i,6	i,6(3)		i,6(6)	
Anal fin	iii,6	ii,6(3)		iii,5(4); iii,6(2)	
Pectoral fin	1,10	1,9(3)		1,9(6)	
Pelvic fin	1,5	1,5(3)		1,5(6)	
Caudal fin	8 + 9	8 + 9(3)		8 + 9(6)	
Gill rakers (Ant. arch)	1 + 5	2 – 3 + 4 – 5		1 – 3 + 3 – 4	
Vertebrae					
Total vertebrae*	38	39(3), 40(5)		37(1), 38(4), 39(1)	
Precaudal vertebrae*	16	17(6), 18(2)		15(1), 16(2), 17(3)	
Caudal vertebrae*	22	22(6), 23(2)		21(2), 22(4)	
Predorsal vertebrae*	5	3(1), 4(4), 5(3)		5(2), 6(4)	
Preanal vertebrae*	20	22(5), 23(3)		21(1), 22(3), 23(1), 24(1)	
Hypural pattern	Ph + 1 + 2 – 3 – 4 – 5 + 6	Ph – 1 + 2 – 3 – 4 – 5 – 6(1) Ph – 1 + 2 – 3 + 4 – 5 – 6(2)		Ph + 1 + 2 – 3 – 4 – 5 + 6(2) Ph + 1 + 2 – 3 + 4 – 5 + 6(2)	

*Vertebral count exclude 1–4 Weberian vertebrae.

gests it is not from the population from the upper reaches of the river. It may represent a hybrid specimen but is best considered a junior synonym of *A. uranoscopus*.

The study of the type specimens of these widely scattered nominal species suggests that a single widespread species is present. However, it would not be wise to formally unite all these nominal species until the limits of variation of the parent populations, and possibly intermediate populations as for the Zambezi southwards, are better known. For the present three closely similar and possibly related species are therefore recognized, *A. lampei* in the Webi Shebeli system, *A. kivuensis* around Lake Kivu and northern Lake Tanganyika and *A. natalensis* from tributaries of the Zambezi southwards to the Umkomaas River in Natal.

The pattern of distribution of these species is interesting in that it conforms to the archipelago-like pattern of the Afro-montane Region (White, 1978) and outliers of the Capensis Region (Taylor, 1978). The distributions of several other unrelated fish species or species groups in southern Africa are also known to agree with this pattern. The pattern has been well exposed for various invertebrates (Stückenberg, 1962) amphibians and reptiles (Poynton, 1964; Poynton & Broadley, 1978), birds (Moreau, 1966; Hall & Moreau, 1970) and possibly even mammals (Delaney & Happold, 1979). The basic idea offered to explain this distribution has been that these are refugia which expand and contract their range under long-term climatic fluctuations. The result is a recurrent merging and isolation of the ecozones allowing the flora and fauna to colonize a much wider range than the present restricted areas around high mountains and mountain belts. Freshwater fishes that agree with this pattern are riverine species favouring headwater environments. Presumably these situations are those most likely to undergo catchment transfers through river piracies, especially during pluvial periods, which could provide the effective means for attaining such wide distribution ranges as witnessed for *A. natalensis, A. kivuensis* and *A. lampei*.

DESCRIPTION OF A NEW *AMPHILIUS* SPECIES FROM THE BUZI RIVER

Amphilius laticaudatus **sp. nov.**
Buzi River catlet. Figs 15, 16, 17.

Holotype: AMSA/P 5815 ♀ 51,5 mm SL. Buzi River at bridge on Inchope to Lourenco Marques road, Mocambique, 19° 55′S, 34° 15′E. Collector, G. Bell-Cross, 6 August 1972.

Paratypes: 2, AMSA/P 5816 ♀ 50,5 mm SL, ♂ 24,6 mm SL. 19 km above new Revue River bridge, Revue River, Buzi River system, Mocambique. 19° 10′S, 33° 15′E. Collector, G. Bell-Cross, 15 August 1972.

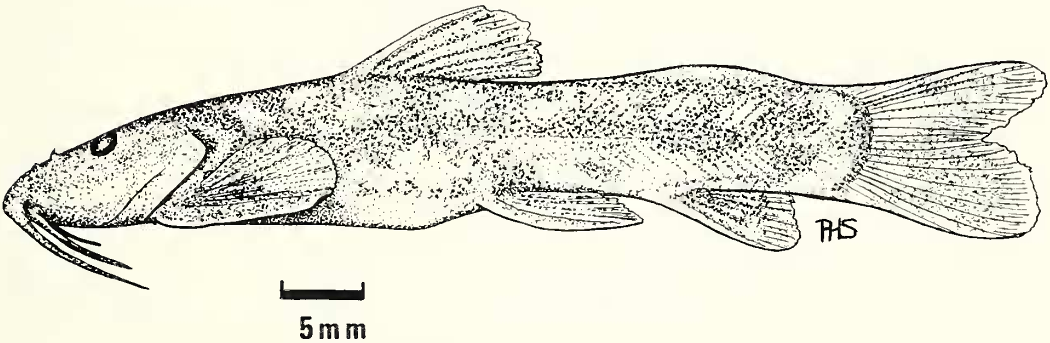


Fig. 15. Lateral view of holotype of *Amphilius laticaudatus* (sp. nov.) AMSA/P 5815; SL = 51,5 mm ♀.

Diagnosis

A small *Amphilius* species (maximum length recorded, 51,5 mm SL) with morphometric proportions and meristic characters as recorded in Table 8. Head flat below, convex above and bluntly rounded anteriorly. Head 3,8 to 4,1 ($\overline{M}4$) ($\bar{x}$ = 4) times in SL, entirely covered with fleshy skin. Angle of lateral profile shallow (20–30°), rising in gentle arch to dorsal fin. Eyes dorso-lateral without free orbit and widely spaced. Nares widely separate, anterior rounded short tubular, posterior oval with fleshy ridge, located approximately in mid-third of snout. Mouth sub-terminal, gently curved (almost straight) and broad (about half total width of head). Lips moderately fleshy. Three pairs of simple tapered circum-oral barbels (Fig. 16), maxillaries extending laterally from upper jaw reaching to anterior base of pectoral fin; outer mandibulars extend from lateral angle of mouth reaching anterior base of pectoral fin; inner mandibulars with base directly medial to outer pair, not reaching posterior edge of branchiostegal membrane (Fig. 16). Branchiostegal membrane free, continuous but deeply notched mid-ventrally.

Body sub-oval anteriorly, flattened below from between pectoral fins to anal region behind pelvic fins, increasingly compressed from behind pelvics to caudal peduncle. Caudal pe-

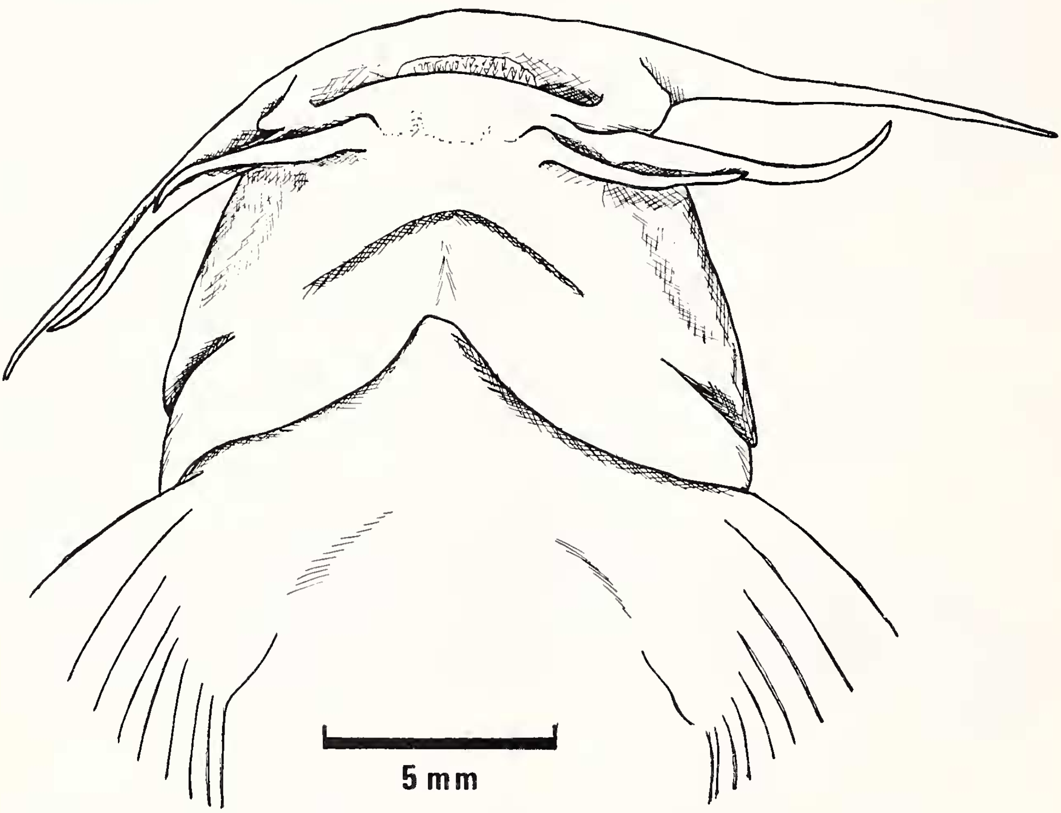


Fig. 16. Ventral view of head of holotype of *Amphilius laticaudatus* (sp. nov.) AMSA/P 5815; SL = 51,5 mm ♀.

TABLE 8

Morphometric and meristic measurements of the type specimens of *Amphilius laticaudatus*

HT — Holotype

Measurement	Mean	Range	(HT)
Standard length		24,6 –51,5	51,5
As % Standard length			
Predorsal length	44,0	43,1 –44,7	44,3
Head length	24,8	24,1 –26,0	24,3
Head depth	13,8	12,9 –14,3	12,9
Head width	24,1	23,5 –24,4	23,5
Head — dorsal (H-D)	20,0	17,9 –21,4	21,4
Head length/Head to Dorsal (Not % SL)	1,25	1,13– 1,45	1,13
Body depth	16,5	15,0 –19,2	15,3
Body width	18,3	15,4 –20,0	19,6
Caudal peduncle length	16,8	16,7 –16,9	16,7
Caudal peduncle depth	13,5	12,9 –14,3	12,9
Dorsal fin	23,3	21,6 –26,0	22,4
Anal fin	18,5	17,1 –20,3	17,1
Pectoral fin	24,3	23,6 –24,9	24,5
Pelvic fin	20,9	19,9 –21,6	21,2
As % Head length			
Snout	52,0	51,6 –53,2	53,2
Orbit	16,0	14,1 –17,9	16,1
Interorbit	33,3	30,1 –35,9	33,9
Postorbit	41,0	37,4 –43,5	43,5
Maxillary barbel	75,7	72,6 –78,1	72,6
Mandibular barbel (inner)	41,9	35,9 –52,0	37,9
Mandibular barbel (outer)	56,2	48,8 –60,5	60,5
As % Snout length			
Orbit-post. nare	37,0	30,3 –40,9	40,9
Post. nare-ant. nare	34,8	28,6 –42,4	33,3
Ant. nare-mid tip	43,0	39,7 –48,5	40,9
Adipose fin	19,9	17,6 –22,4	19,6
Fin Rays			
Dorsal fin	1,6(3)		1,6
Anal fin	1,5; iii, 5; iii, 4		iii,4
Pectoral fin	1,9; 10(1)		1–10
Pelvic fin	1,5(3)		1,5
Caudal fin	8 + 9(3)		8 + 9
Gill rakers	1 – 2 + 3 – 4		2 + 4
Vertebrae			
Vertebrae	32(1), 33(1), 34(1)		32
Precaudal vertebrae	15(2), 16(1)		15
Caudal vertebrae	17(1), 18(2)		17
Predorsal vertebrae	3(1), 4(2)		3
Preanal vertebrae	19(2), 21(1)		19
Hypural pattern	Ph–1+2–3–4–5–6		Ph–1+2–3–4–5–6

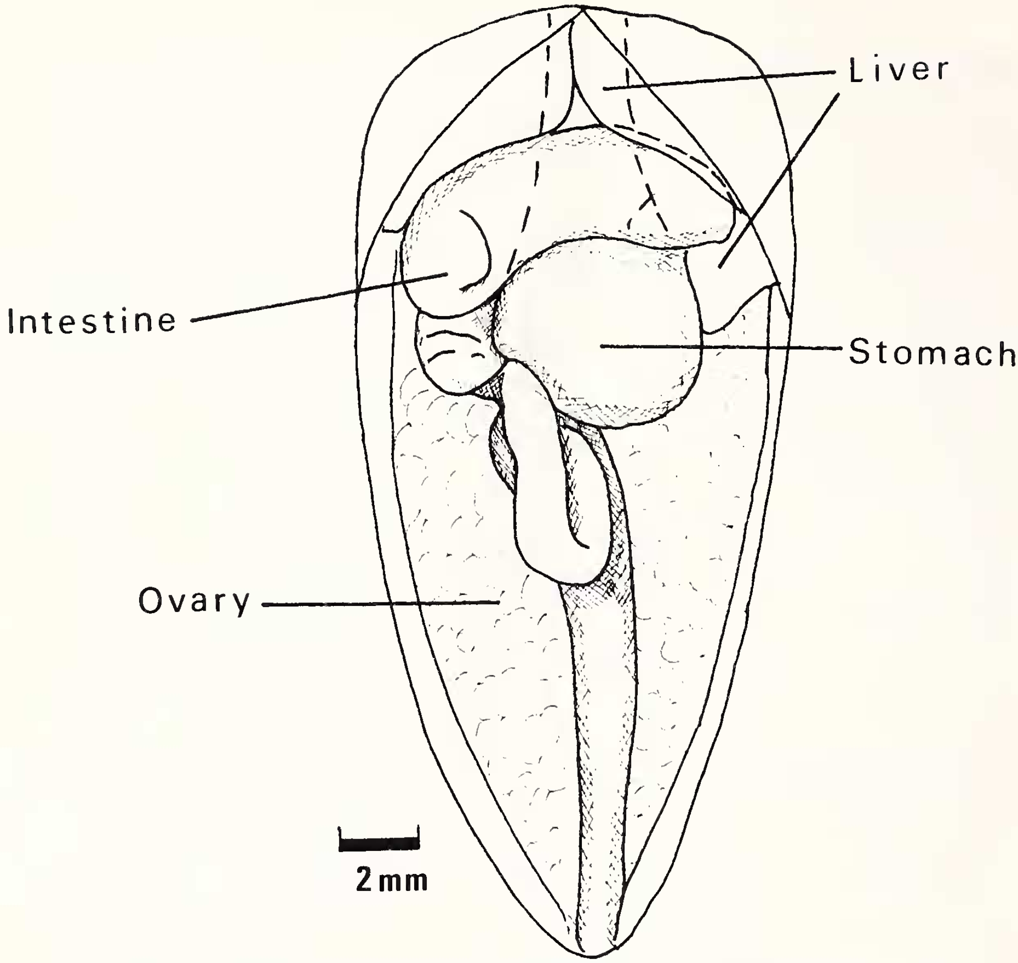


Fig. 17. Semi-diagrammatic view of alimentary canal *in situ* of paratype of *Amphilius laticaudatus*.

duncle short, 1,24 (1,18–1,29) times as long as deep. Anus located between pelvic, one quarter of distance from posterior edge of pelvic bases to anal fin. Skin smooth throughout.

Dorsal fin with rounded or straight posterior edge; simple leading ray segmented and flexible, slightly shorter than first branched ray. Origin of dorsal over hind margin of pectoral fins. Dorsal fin base entirely ahead of pelvic fins. Adipose dorsal fin low and smoothly confluent with caudal ridge. Pectoral fins large and rounded with outer rays horizontal and inner rays directed postero-dorsally against body. Leading ray expanded with fine filaments and covered by thick pad. Pelvics similarly expanded but smaller, inner rays in same horizontal plane as other rays of this fin. Leading ray expanded with fine filaments and covered by thick pad. Anal fin short with straight posterior edge. Caudal fin shallowly forked with rounded lobes.

Lateral line simple, straight, extending mid-laterally from head to posterior end of caudal peduncle. Teeth small, villiform, in broad bands on premaxillary and along ramus of lower jaw. Gill rakers long and slender, absent from posterior rim of first and second arches (in the holotype the second arch has a single raker on posterior edge of dorsal limb). Alimentary canal short, as illustrated in Fig. 17.

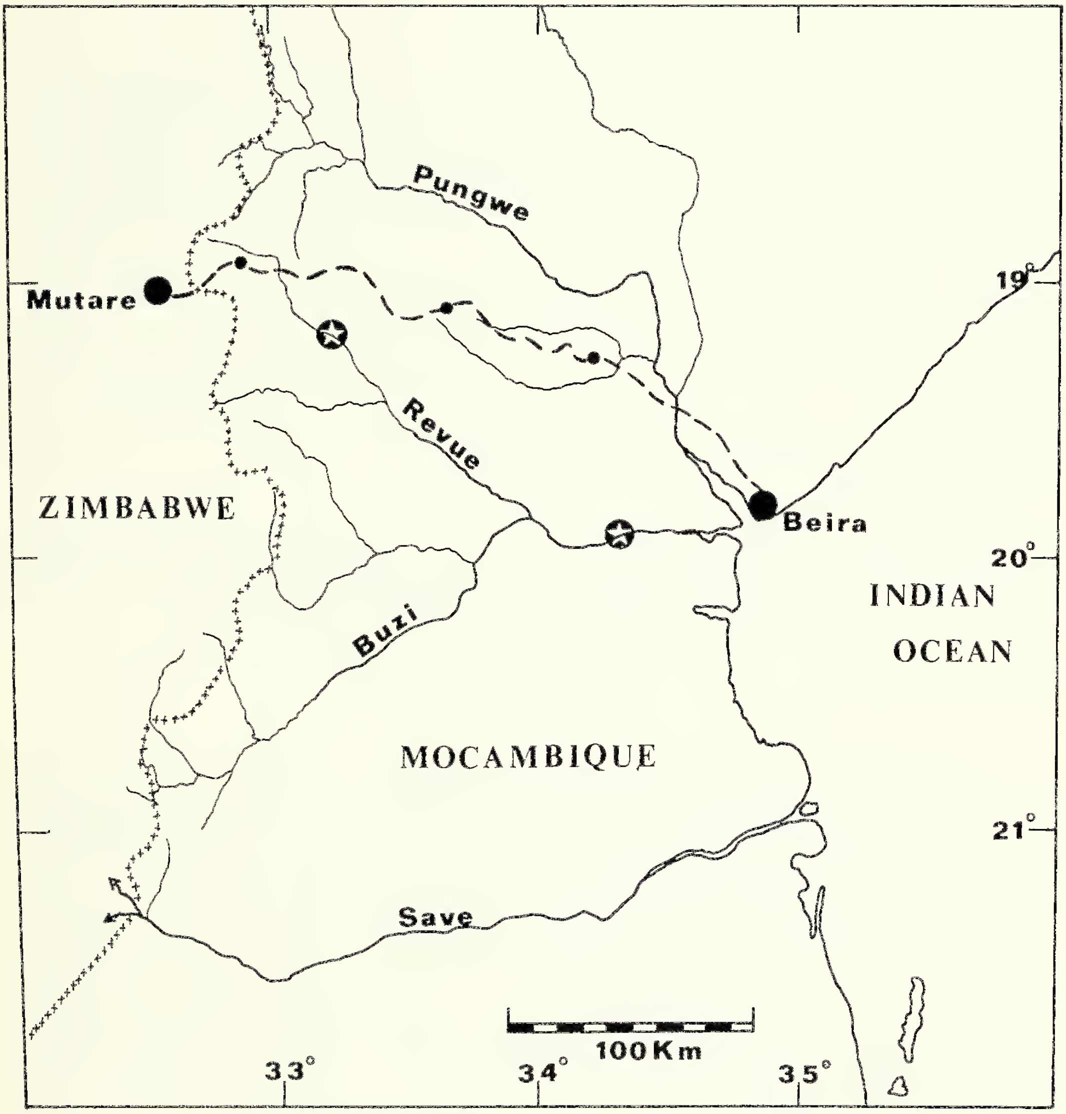


Fig. 18. Collecting sites ⊛ of *A. laticaudatus* in the Buzi River system.

Preserved colours mottled brown and cream, eyes black. Pigment pattern irregular and heavily mottled with speckled pigment clouds and three or four large cream saddles on dorsal surface, one over predorsal area, one behind base of dorsal fin, one over pre-adipose region and the fourth over the posterior portion of the adipose fin and adjacent body regions. Saddles bordered by broad dark band. Belly and ventral surfaces pale cream. Dark crescent along base of caudal fin. Fins mottled with brown pigment tending to form a band on dorsal and caudal fins.

Comparison with A. uranoscopus *and* A. natalensis

A. laticaudatus differs from both *A. uranoscopus* and *A. natalensis* in having fewer vertebrae, particularly fewer caudal vertebrae. It has a shorter, deeper caudal peduncle than either of these species and also a longer predorsal distance. The head is relatively large being longer, broader and deeper than that of *A. natalensis* and although only marginally longer and broader than that of *A. uranoscopus* it is relatively deeper. These proportions are also reflected in the body measurements. *A. laticaudatus* has a relatively large eye compared with either sympatric species. *A. laticaudatus* also differs from *A. natalensis* in having generally fewer predorsal and preanal vertebrae and a more deeply notched branchiostegal membrane. *A. natalensis* in the Buzi River has a similar adipose fin but differs in pigmentation as specimens of this species are generally a uniform dark brown with small pale dorsal 'saddles'. *A. uranoscopus* has a shorter head to dorsal distance and correspondingly fewer predorsal vertebrae than has *A. laticaudatus*. The eyes are smaller and more closely set and the nares further forward on the snout in *A. uranoscopus*.

The adipose fin in *A. uranoscopus* is notched behind to form a free edge and has not been seen to be confluent in any population examined.

Distribution and habitat

A. laticaudatus was collected from two sites within the Buzi system (Fig. 18). A description of the habitat at these localities was provided by the collector, Mr G. Bell-Cross: the collecting sites were all in fast flowing shallow water up to 0,5 m deep over rocks and pebbles. The predominant and usually solitary macrophyte was *Hydrostachys polymorpha*.

Etymology

Laticaudatus refers to the relatively short deep caudal peduncle of the new species.

DISCUSSION

Bell-Cross (1973) prepared a checklist of the ichthyofauna of Buzi River, but concluded that it was probably incomplete. This paper adds two *Amphilius* catfish species to that list. The Buzi system certainly is exceptional in regard to its fish fauna and warrants a great deal of further investigation. Study of its hydrographical history would be of great interest to zoogeographers and would help to unravel the questions of origin of its ichthyofauna.

At this stage there is little indication of the phyletic relationships of *Amphilius laticaudatus*. It shares certain plesiomorph characteristics (e.g. caudal fin rays) with other *Amphilius* sp. which merely suggest its broad group affinities with east and southern African *Amphilius* by excluding relationship with west African species. Similarities in pigmentation with certain *A. natalensis* populations (e.g. in the Ruo River, Malaŵi) are not supported by other more tangible characteristics and, besides, such similarity is also to be found in various populations of several widespread *Amphilius* species. Study of the skeleton of the species might indicate its relationships, but additional material would be required.

The question of the correct identity of *Amphilius brevidorsalis* Pellegrin has been reasonably solved by reference to the type specimen. It is definitely not a specimen of *A. laticaudatus* nor of *A. natalensis* but agrees in the general characters with *A. uranoscopus* in all respects apart from the short dorsal fin. On its own the short dorsal fin (fewer rays) probably represents the extreme of natural variation or an isolated mutation and certainly does not require formal recognition of any kind.

SUMMARY

The paper considers the taxonomy of *Amphilius* species from east and southern Africa. It is clear that the widespread species of this region has been grossly misidentified as *A. platychir*, a species confined in reality to West Africa. The valid name for the widespread species of east and southern Africa is *A. uranoscopus*. A second species *A. natalensis* is found in tributaries of the lower Zambezi River southwards to Natal. It is similar to *A. kivuensis* from mountain streams around Lake Kivu and *A. lampei* from the mountains of Ethiopia. A new species of *Amphilius* is described, apparently confined to the Buzi River system of Mozambique.

An abbreviated synonymy of the species considered is as follows:

1. *Amphilius platychir* (Günther, 1864)

Synonyms: *Pimelodus platychir* Günther, 1864.
Amphilius platychir: only references to the species from West Africa.
Amphilius grammatophorus Pellegrin, 1913.

2. *Amphilius uranoscopus* (Pfeffer, 1889)

Synonyms: *Anoplopterus uranoscopus* Pfeffer, 1889.
Amphilius uranoscopus
Amphilius platychir: all references to this species from east central and southern Africa.
Amphilius platychir cubangoensis Pellegrin, 1936.
Chimarrhoglanis leroyi Vaillant, 1897.
Amphilius leroyi
Amphilius jacksoni David, 1937: 418.
Amphilius grandis Boulenger, 1905.
Amphilius transvaalensis (see note in Harry, 1953)
Amphilius hargeri Boulenger, 1907.
Amphilius kreffti Boulenger, 1911.
Amphilius oxyrhinus Boulenger, 1912.
Amphilius brevidorsalis Pellegrin, 1919.

3. *Amphilius lampei* Pietschmann, 1913.

4. *Amphilius natalensis* Boulenger, 1917.

Synonyms: *Amphilius longirostris* (*non* Boulenger) Gilchrist & Thompson, 1917: 558 Fig. 166
Amphilius lampei (*non* Pietschmann) Bell-Cross & Jubb, 1973: 4, Fig. 3.

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APPENDIX 1

Material measured and/or x-rayed (excluding types given in Table 1).

This appendix lists material specifically measured and/or x-rayed for this study. In addition the entire collection of *Amphilius* in the Albany Museum was examined and sorted according to the findings of the study. A complete list of this material is available on request. Material of these species in the British Museum (Natural History), Museum National d'Histoire Naturelle, Paris, and Museum Royale d'Afrique Centrale, Tervuren, was cursorily examined without measurement or being x-rayed.

ABBREVIATIONS

Amphilius uranoscopus

Reg. No.		Locality (River and System)	Collector	Date
AMSA/P	326	Marozi R. Zambezi	R. A. Jubb	04/1958
	506	Ruo R. Zambezi	G. Bell-Cross	12/1964
	672	Odzi R. Save	R. A. Jubb	05/1958
	718	Marozi R. Zambezi	R. A. Jubb	05/1958
	1219	Mhlambonyati R. Incomati		1968
	1990	Lundi R. Save	F. Junor	1963
	4235	Komati R. Incomati	I. Gaigher	05/1967
	4236	Noordkaap R. Incomati	I. Gaigher	04/1967
	4239	Elands R. Incomati	F. J. van der Merwe	09/1965
	4252	Komati R. Incomati	I. Gaigher	05/1967
	4255	Molapitsi R. Limpopo	F. J. van der Merwe	06/1965
	4258	Komati R. Incomati	F. J. van der Merwe	01/1966
	4270	Waterval R. Incomati	I. Gaigher	06/1968
	4276	Olifants R. Limpopo	F. J. van der Merwe	09/1965
	5083	Mooketsi R. Limpopo	I. Gaigher	05/1968
	5120	Pongola	R. McC. Pott	06/1967
	5196	Pivaan R. Pongola	R. McC. Pott	06/1967
	5199	Assegaai R. Pongola	R. McC. Pott	06/1967
	5216	Usutu R. Pongola	R. McC. Pott	06/1967
	5304	Levubu R. Limpopo	I. Gaigher	07/1968
	5439	Ngwempisi R. Pongola	R. McC. Pott	06/1967
	5631	Okavango R.	B. v. d. Waal	11/1977
	5664	Okavango R.	B. v. d. Waal	11/1977
	5730	Okavango R.	B. v. d. Waal	11/1977
	5814 (in part)	Pungwe R.	G. Bell-Cross	06/1972
	5896	Ngwempisi R. Pongola	R. McC. Pott	06/1967
	6178	Usutu R. Pongola	R. McC. Pott	07/1967
	6188	Usutu R. Pongola	R. McC. Pott	07/1967
	7120	Spekboom R. Limpopo	I. Gaigher	05/1968
	7134	Treur R. Limpopo	Provincial Fish Inst.	
	7250	Mogol R. Limpopo	C. J. Kleynhans	09/1979
	7550	Ndzelele R. Limpopo	C. J. Kleynhans	12/1979
	7785	Letsitele R. Limpopo	C. J. Kleynhans	09/1980
QVM	2922 (in part)	Mtarazi R. Pungwe	I. Thompson	12/1972

Amphilius natalensis

Reg. No.	Locality (River and System)	Collector	Date
AMSA/P 326	Marozi R. Zambezi	R. A. Jubb	04/1958
680	Marozi R. Zambezi	R. A. Jubb	05/1958
714	Pungwe R.	National Museum Rhodesia	11/1957
718	Marozi R. Zambezi	R. A. Jubb	05/1958
863	Inyamvubu R. Tugela	Natal Parks Board	08/1964
895	Otimati R. Tugela	F. Farquharson	04/1964
1193	Ngwempisi R. Pongola	R. McC. Pott	1969
1198	Sand R. Incomati	I. Gaigher	1968
1285	Pungwe R.	D. C. H. Plowes	08/1965
1618	Lunsklip R. Incomati	I. Gaigher	1967
2094	Tugela R.	F. Farquharson	
2112	Nyazengu R. Pungwe	G. Bell-Cross	06/1972
3761	Blyde R. Limpopo	P. le Roux	06/1967
4277	Crocodile R. Incomati	F. J. van der Merwe	09/1965
4328	Tugela R.	R. Crass	
4336	Nyazengu R. Pungwe	G. Bell-Cross	06/1972
5110 (in part)	Assegaai R. Pongola	R. McC. Pott	06/1967
5814	Pungwe R.	G. Bell-Cross	06/1972
5815 (in part)	Buzi R.	G. Bell-Cross	08/1972
5816	Buzi R.	G. Bell-Cross	08/1972
7105	Hlelo R. Pongola	R. McC. Pott	06/1967
7291	Blyde R. Limpopo	C. J. Kleynhans	11/1978
8644	Soada R. Umkomaas	O. Bourquin	11/1981
9557	Krantzkloof R. Umgeni	R. Crass	11/1958
9558	Mweni R. Tugela	M. Coke	10/1968
9562	Ingogo R. Tugela	M. Coke	02/1964
QVM 2922	Mtarazi R. Pungwe	I. Thompson	12/1972
BMNH 1978 12.13: 13–14	Ruo R. Zambezi	D. Tweddle/N. Willoughby	1978